I²C™ Real-Time Clock/Calendar

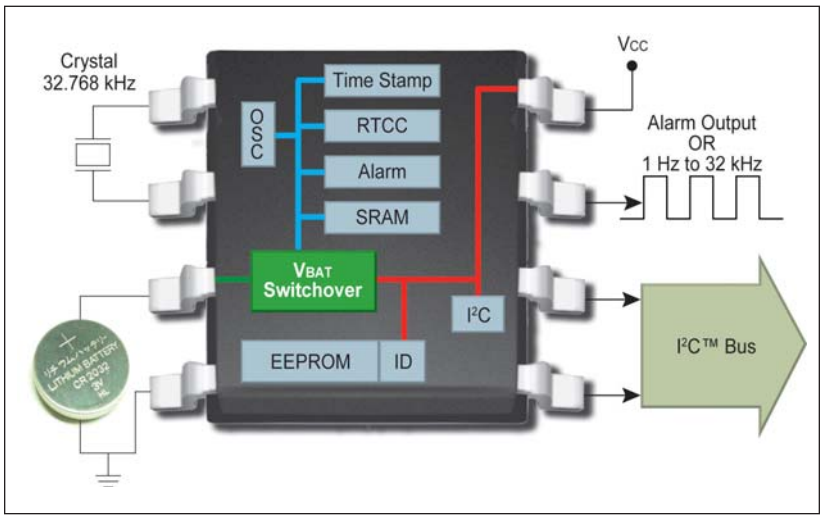
Low cost and feature rich, with memory and battery switchover

- As crystal frequency drifts, would you like to keep accurate time by loading a calibration value?
- If system power is lost, would you like to know how long power has been off?
- Do you have size and cost constraints that would benefit from the embedded memory?
- Is your MAC Address programming inefficient and could benefit from a preprogrammed device?

MCP7941X Features

- **Real-Time Clock/Calendar (RTCC)**
  - Alarm counter down to the second
  - Programmable alarm or clock output
  - Digital trimming for higher accuracy
- **User Memory**
  - Battery-backed SRAM: 64 bytes
  - EEPROM: 1 Kbit
  - Unique ID: 64 bits of protected EEPROM
- **Low Power**
  - Minimum operating and backup voltages:
    - V_{CC} = 1.8V,
    - V_{BAT} = 1.3V
  - Typical operating and backup currents:
    - I_{CC} < 400 µA @ 3V
    - I_{BAT} < 700 nA @ 1.8V
  - Battery Switchover with Timestamp
- **Industry-Standard Pinout**
  - 8-pin packages

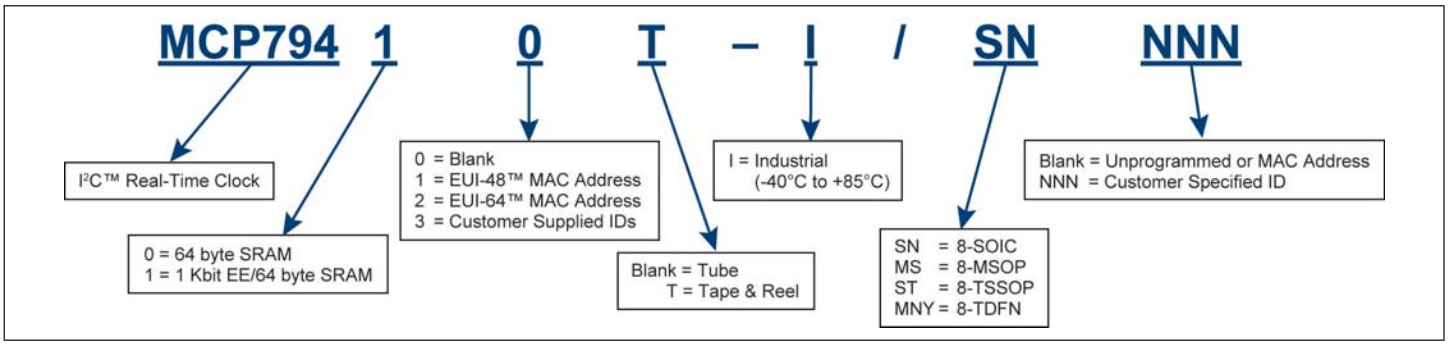
Block Diagram



Pin Functions

Name	Pin	Pin Functions
X1	1	Xtal/Input
X2	2	Xtal/Output
VBAT	3	Battery Backup
Vss	4	Ground
SDA	5	Serial Data I/O
SCL	6	Serial Clock
MFP	7	Interrupt*/Clock Output
Vcc	8	Supply Voltage

Ordering Information



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Design Requirements/Solutions

Design Requirements	RTCC as Part of the Solution	
	RTCC Feature	Issue/Solution
Continuous clock operation to monitor power failures	Battery Switchover and Power-Fail Timestamp	■ When main power fails or is turned off – Time is logged when VCC switches to VBAT – Time is logged again when VCC is restored – MCU reads RTCC registers to determine timeframe
Accurate time over temperature	Digital Trimming	■ As crystal frequency drifts, software can compensate – MCU reads temperature sensor data – MCU uses data to adjust RTCC trim constants – Also called Software Temperature Compensation
Calibration parameters and system status stored	EEPROM and SRAM	■ Important data needs to be saved in non-volatile memory – EEPROM and battery backed SRAM available
Ethernet or wireless interface	Unique ID with MAC Address	■ MAC Address is necessary for network interface – Factory programmed device saves time and cost – EUI-48 or EUI-64 are standard IEEE unique identifiers – Customer supplier ID can be programmed
Maximize battery life needed for main power	Multifunction Output ($\overline{IRQ}$/CLK)	■ Minimize the power drawn from the main battery – Place the MCU in Sleep mode or turn it off – Use RTCC alarm out to wake MCU or turn power on

RTCC Development Environment

RTCC PICtail™ Plus daughter boards plug into compatible development systems.

Part Number	Development Tool	Description
AC164140	MCP7941X PICtail Plus Daughter Board	Daughter board for evaluation of I²C™ general purpose RTCC.
DM240001	Explorer 16 Development Board	Evaluate the PIC24F, dsPIC33 and PIC32MX operation with RTCC.
DM183032	PICDEM™ PIC18 Explorer Board	Evaluate PIC18 MCU operation with RTCC.
DM240311	XLP 16-bit Development Board	Evaluate 16-bit XLP MCU operation with RTCC.
DV164122	PICkit™ Serial Analyzer	Communicate directly with I²C port on RTCC PICtail™ board.

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www.microchip.com/Clock

Visit our web site for additional product information and to locate your local sales office.

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